



# Department of Defense DIRECTIVE

NUMBER 4151.18

March 31, 2004

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USD(AT&L)

SUBJECT: Maintenance of Military Materiel

- References: (a) DoD Directive 4151.18, "Maintenance of Military Materiel," August 12, 1992 (hereby canceled)
- (b) [DoD 4151.18-H](#), "Depot Maintenance Capacity and Utilization Measurement Handbook," January 24, 1997
  - (c) [DoD Instruction 1348.30](#), "Secretary of Defense Maintenance Awards Program," March 7, 1997
  - (d) [DoD 5025.1-M](#), "DoD Directives System Procedures," March 5, 2003
  - (e) through (k), see enclosure 1

## 1. REISSUANCE AND PURPOSE

This Directive:

1.1. Reissues reference (a) to establish policies and assign responsibilities for the performance of DoD materiel maintenance, including maintenance of weapon systems, hardware, equipment, software, or any combination thereof and for both organic and contract sources of repair.

1.2. Authorizes the publication of reference (b), and reference (c), in accordance with reference (d).

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## 2. APPLICABILITY

This Directive applies to the Office of the Secretary of Defense, the Military Departments, the Chairman of the Joint Chiefs of Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities in the Department of Defense (hereafter referred to collectively as "the DoD Components").

## 3. POLICY

It is DoD policy that:

3.1. Maintenance programs for DoD materiel shall be structured and managed to achieve inherent performance, safety and reliability levels of the materiel. Maintenance tasks restore safety and reliability to their inherent levels when deterioration has occurred. Maintenance programs are structured for meeting readiness and sustainability objectives (including mobilization and surge capabilities) of national defense strategic and contingency requirements. In addition, maintenance programs shall:

3.1.1. Employ maintenance concepts that optimize process technologies, organizational structures and operating concepts to deliver efficient and effective performance to the operating forces.

3.1.2. Be clearly linked to strategic and contingency planning.

3.1.3. Provide organic maintenance for inherently Governmental and core capability requirements in accordance with Section 2464 of title 10, United States Code (reference (e)). Non-core capability requirements shall be satisfied using competitive sourcing, as appropriate, and in accordance with Section 2462 of title 10, United States Code (reference (f)) and Section 2466 of title 10, United States Code (reference (g)), to lower costs and improve performance across the full spectrum of maintenance activities.

3.1.4. Be designed for minimizing the total life-cycle cost of ownership. The programs shall effectively address all maintenance requirements whether afloat, at a fixed base, deployed site, centralized repair activity, in storage, or en route. Their design shall minimize the footprint of maintenance capabilities employed in an area of operation.

3.1.5. Adopt business practices and quality management processes to continuously improve maintenance operations and maintenance production, achieve cost savings and avoidance, and realize process cycle time reduction.

3.1.6. Invest in the development of new technologies to improve the reliability, maintainability and supportability of DoD materiel, including the cost, schedule effectiveness, and quality of maintenance tasks and processes.

3.1.7. Employ the full spectrum of maintenance support structures available to sustain military materiel, including organic or unique military capabilities, performance-based logistics arrangements, commercial sector support, partnering, and competition, as applicable. The programs shall appropriately use corporate contracting techniques for depot maintenance of secondary items.

3.1.8. Ensure access to support and support-related technical information is consistent with the planned support concept to cost effectively maintain fielded systems and foster competition for sources of support throughout the life of the fielded systems.

3.1.9. Take steps to minimize and prevent Environmental, Safety, and Occupational Health hazards in maintenance activities. The use, generation, storage and disposal of hazardous materiel at maintenance locations shall be minimized. Design of maintenance tasks and processes shall give consideration to environmental and human factors to allow for safe, efficient, and effective task accomplishment.

3.1.10. Comply with periodic and as-required reporting requirements.

3.2. Initial maintenance program management shall begin at acquisition program initiation. Maintenance processes shall be structured to provide information necessary for design improvement of DoD materiel when inherent performance or reliability levels prove inadequate. Initial maintenance programs shall:

3.2.1. Be developed concurrently with materiel design, beginning with an analysis of failure modes and effects. The programs shall consist of applicable and effective tasks for addressing the failure modes and effects using reliability-centered analysis, and shall allocate tasks to appropriate levels of maintenance (i.e., field and depot) based on criteria derived from customer requirements and cost-effectiveness analysis. Task development shall include: determination of initial compliance thresholds and task repetition intervals; and a plan for providing feedback to the design process if effective maintenance tasks cannot adequately address a failure mode or effect.

3.2.2. Identify depot maintenance core capability requirements, as required by reference (e). Depot maintenance core capability requirements shall be identified as early as possible in the acquisition life cycle. The capabilities to support these depot maintenance core requirements shall be established not later than 4 years after Initial Operational Capability for DoD materiel directly supporting the Department's strategic and contingency plans. Exceptions to this requirement can be made for systems and equipment under special access programs, nuclear carriers, and commercial items. This requirement for establishing core capability applies to public sector depot maintenance resources (including personnel, equipment, and facilities) maintained by the Department of Defense. Required core capabilities, and the depot maintenance workloads needed to sustain those capabilities, shall be calculated by the individual DoD Components in accordance with a methodology approved by the Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD(AT&L)). Workloads required to sustain core capability requirements shall be the primary workloads assigned to DoD depots. Core capabilities and associated workloads shall be adjusted periodically, and reviewed formally on a biennial basis, for force structure changes, introduction of new weapon systems, and changes in battle doctrine to counter emerging threats. All maintenance and repair of weapon systems necessary for strategic and contingency plans need not be performed in public facilities; rather, the capability (in the form of skills, equipment and facilities) to perform maintenance and repair of these systems must be retained in those facilities.

3.2.3. Incorporate sustainment procedures interfacing effectively with DoD logistics processes for DoD materiel that shall be maintained by the private sector.

3.2.4. Minimize requirements for support equipment including test, measurement, and diagnostic equipment. When the use of support equipment may not be eliminated, standardize support equipment design for the broadest possible range of applications, consistent with maintenance concepts. Maintenance programs for military materiel shall utilize diagnostics, prognostics and health management techniques in embedded and off-equipment applications when feasible and cost-effective. Maintenance programs shall provide the organic maintenance workforce with the range of technological tools necessary to enhance capabilities (e.g., interactive technical manuals, portable maintenance aids, access to technical information), properly equip the workforce and provide adequate technical and managerial training.

3.2.5. Employ Serialized Item Management (SIM) techniques to effectively manage populations of select items throughout their life cycle. SIM programs shall focus on providing comprehensive and timely data for each identified item. DoD materiel shall be equipped with Automatic Identification Technology (AIT) allowing for

paperless identification, minimizing data entry requirements, and facilitating digital storage and retrieval of essential information including maintenance history. SIM programs shall build on existing serial number tracking initiatives and leverage continuing progress in AIT.

3.3. Throughout the life cycle of military materiel, maintenance programs shall be adjusted periodically to improve maintenance agility, increase operational availability, and reduce life-cycle total ownership costs. In addition:

3.3.1. Maintenance engineering (the application of techniques, engineering skills, and effort organized to ensure the design and development of weapon systems and equipment provide adequately for effective and economical maintenance) shall be used for identifying the most cost-effective combination of maintenance capabilities provided via organic, contract, and inter-Service sources of repair.

3.3.2. Commercial items should employ applicable commercial maintenance programs.

3.3.3. Depot maintenance programs shall apply the core methodology approved by the USD(AT&L), selecting between public and private sector accomplishment, and for defining organic capability requirements.

3.3.3.1. The DoD Components shall designate each major organic depot maintenance activity as a Center of Industrial and Technical Excellence (CITE) in one or more specific technical competencies required for core capabilities. The DoD Components shall engineer industrial processes and adopt contemporary business practices to make the CITEs industrial leaders in their respective core competencies. In addition, source of repair assignments for depot maintenance workloads shall consider requirements for maintenance of identical or similar DoD materiel, and combine or consolidate similar requirements whenever feasible.

3.3.3.2. When choosing sources of repair for depot maintenance workloads considered unnecessary for sustaining core capabilities, the DoD Components shall apply a risk mitigation analysis and consider factors such as cost, performance and responsiveness. Such maintenance workloads may be performed using private sector or public sector sources, depending on best value to the Government.

3.3.3.3. As provided in reference (e), workloads required to maintain core depot maintenance capabilities shall not be subjected to cost studies under OMB Circular A-76 or DoD Directive 4100.15, "Commercial Activities Program" (reference (h)), unless the Office of the Secretary of Defense determines that Government performance of the workload is no longer required for National Defense reasons.

3.3.3.4. Initial organic depot maintenance source of repair assignments shall employ merit-based selection procedures to select among alternative sources. Depot maintenance workloads previously accomplished at organic facilities, with a value of at least three million dollars, shall also be subjected to merit-based selection procedures when deciding between alternative organic sources of repair. Competition between DoD organic depot maintenance activities and private-sector commercial firms (for workloads not required to sustain core capabilities) may be used to achieve economies and efficiencies in maintenance of military materiel. When engaging in public-private competitions for depot maintenance sources of repair, the provisions for cost studies under OMB Circular A-76 and reference (h) do not apply. DoD organic depot maintenance activities are authorized to compete for performance of depot maintenance workloads generated by non-Defense agencies of the Federal Government, when competitive source selection processes are employed by the requiring Agency.

3.3.3.5. Public-private partnering and other collaborative arrangements for depot maintenance operations shall be employed whenever feasible and beneficial.

3.3.4. Maintenance programs for materiel maintained for the Department of Defense shall facilitate, collect, and analyze maintenance-related reliability data. The programs shall include sufficient analytic capability for identifying needed adjustments based on operating experience, materiel condition, and requirements for reliability, maintainability and supportability modifications, and changes to training curricula or delivery methods. The programs shall provide maintenance activities the means for assessing information generated by prognostic and diagnostic capabilities and for taking appropriate maintenance actions. The programs shall also establish and evaluate performance metrics that promote continuous improvement in maintenance, ensuring responsiveness and best value to operating forces.

3.3.5. Cannibalization, when properly managed and controlled, may be a cost-effective and mission-enhancing logistics practice. However, the DoD Components must ensure that requisite direction and discipline are applied to ensure no detrimental effects on materiel readiness or the DoD workforce. Therefore, DoD Component policies must ensure that: all cannibalizations are controlled and documented (by recording, as a minimum, national stock number and work unit code of

the cannibalized item, labor hours expended, and the reason for the cannibalization action); unit maintenance manning authorizations include requirements associated with cannibalization actions; and weapon systems that are non-mission-capable for extended periods (e.g., "hangar queen" systems) are identified. In response to Congressional guidance requiring the submission of cannibalization data as part of the Quarterly Readiness Report to the Congress, the DoD Components shall institutionalize data collection and submission processes sufficient to meet those reporting requirements.

3.3.6. The DoD Components shall periodically review field and depot maintenance workloads to identify opportunities for consolidation, regionalization, public-private partnerships, or other types of integrated support arrangements that may yield significant economies of operation while sustaining or improving responsiveness. Inter-Service Support Agreements in accordance with DoD Instruction 4000.19 (reference (i)) and Depot Maintenance Inter-Service Support Agreements shall be employed to establish consolidated and inter-Service maintenance capabilities.

3.3.7. Corrosion prevention and control programs and preservation techniques shall be established throughout the system life cycle. Examples of preventative and control methods may include using effective design practices, material selection, protective finishes, production processes, packaging, storage environments, protection during shipment, and maintenance procedures. Preservation techniques shall be used as a part of maintenance programs when operationally feasible. Corrosion prevention and control reporting systems shall allow for data collection and feedback, and shall be used to address corrosion prevention and control logistics considerations and readiness issues.

3.3.8. The DoD Components shall operate programs for the effective storage and reclamation of materiel withdrawn from operational use on a temporary or long-term basis. Such programs shall be structured to reduce maintenance requirements while preserving materiel capability. Demilitarization and salvage operations must conform to applicable environmental and industrial safety standards.

3.4. DoD maintenance operations shall be supported by robust, effective management information at all levels. Maintenance management information systems shall provide a basis for scheduling, production control, and financial management as well as for assessment of personnel and materiel performance and quality assurance. The DoD Components shall give preference to the use of commercial off-the-shelf information technology products, such as enterprise resource planning. The DoD Components shall select systems that are consistent with the DoD Component enterprise architectures when acquiring or developing information technology products and that are compliant with the DoD Business Enterprise Architecture.



3.5. DoD maintenance activities shall be supported by meaningful financial management information. Maintenance managers shall ensure the costs of operations can be reasonably ascertained and adequately support management requirements, such as determining the costs of ownership, costs of alternate sources of repair, and make versus buy decisions. Job order cost accounting shall be used for all depot maintenance operations and for other maintenance, as appropriate.

3.5.1. DoD depot maintenance activities shall follow the cost accounting requirements identified in DoD 7000.14-R, Volume 11B, Chapter 63 (reference (j)), regardless of the source of funds used to finance such activities.

3.5.2. Regardless of the source of funding or the activity accomplishing the work, the DoD Components shall report depot maintenance cost and production information for all depot maintenance costs as required by DoD 7000.14-R, Volume 6A, Chapter 13 (reference (k)). This includes reporting on all contractor-provided depot maintenance, including depot maintenance performed under contractor logistics support agreements and depot maintenance provided in partnership arrangements.

3.6. The DoD Components shall compute depot maintenance capacity utilization annually, using measurement techniques specified in reference (b). The DoD Components shall minimize unutilized and underutilized plant capacity.

3.7. Outstanding achievements in military equipment and weapon system maintenance by maintenance organizations of the DoD Components shall be recognized through the Secretary of Defense Maintenance Awards Program (reference (c)).

#### 4. RESPONSIBILITIES

4.1. The Under Secretary of Defense (Acquisition, Technology, and Logistics) shall monitor compliance with this Directive and shall:

4.1.1. Review the adequacy of DoD Component maintenance programs and resources.

4.1.2. Review, approve, and consolidate reports submitted by the DoD Components, as appropriate.

4.2. The Heads of the DoD Components shall:

4.2.1. Establish and sustain effective and responsive maintenance programs for assigned DoD materiel.

4.2.2. Program and budget for the necessary resources to administer the maintenance programs.


4.2.3. Develop the tools and management procedures to implement this Directive.

4.2.4. Biennially quantify core depot maintenance capability requirements and the workloads required to sustain the capability and operate it efficiently.

4.2.5. Improve the efficiency and effectiveness of maintenance operations through application of the full range of tools, such as inter-Servicing, consolidation, competition, and public-private partnering.

## 5. EFFECTIVE DATE

This Directive is effective immediately.



Paul Wolfowitz  
Deputy Secretary of Defense

Enclosures - 1

E1. References, continued

E1. ENCLOSURE 1

REFERENCES, continued

- (e) Section 2464 of title 10, United States Code
- (f) Section 2462 of title 10, United States Code
- (g) Section 2466 of title 10, United States Code
- (h) [DoD Directive 4100.15](#), "Commercial Activities Program," March 10, 1989
- (i) [DoD Instruction 4000.19](#), "Interservice and Intragovernmental Support," August 9, 1995
- (j) DoD 7000.14-R, "DoD Financial Management Regulation," Volume 11B, Chapter 63, December 1994
- (k) DoD 7000.14-R, "DoD Financial Management Regulation," Volume 6A, Chapter 14, March 2001